

Feedback

High impact for very low cost, based on moderate evidence.



Feedback is information given to the learner or teacher about the learner's performance relative to learning goals or outcomes. It should aim towards (and be capable of producing) improvement in students' learning. Feedback redirects or refocuses either the teacher's or the learner's actions to achieve a goal, by aligning effort and activity with an outcome. It can be about the output of the activity, the process of the activity, the student's management of their learning or self-regulation, or them as individuals (which tends to be the least effective). This feedback can be verbal or written, or can be given through tests or via digital technology. It can come from a teacher or someone taking a teaching role, or from peers (see [Peer tutoring](#)).

How effective is it?

Feedback studies tend to show very high effects on learning. However, it also has a very high range of effects and some studies show that feedback can have negative effects and make things worse. It is therefore important to understand the potential benefits and the possible limitations of feedback as a teaching and learning approach. In general, research-based approaches that explicitly aim to provide feedback to learners, such as Bloom's 'mastery learning', tend to have a positive impact. Feedback has effects across all age groups. Research in schools has focused particularly on its impact on English, mathematics and, to a lesser extent, science.

Research evidence about feedback was part of the rationale for Assessment for Learning (AfL). One evaluation of AfL indicated an impact of half of a GCSE grade per student per subject is achievable, which would be in line with the wider evidence about feedback.

Other studies reporting lower impact indicate that it is challenging to improve the quality of feedback in the classroom. This has also been demonstrated in a recent EEF pilot study where teachers tried to apply the evidence on feedback through an action research approach.

How secure is the evidence?

There is a substantial number of reviews and meta-analyses of the effects of feedback. Educational (rather than psychological or theoretical) studies tend to identify positive benefits where the aim of feedback is to improve learning outcomes in reading or mathematics or in recall of information. A recent meta-analysis of studies focusing on formative assessment in schools indicates the gains can be more modest, suggesting that an improvement of about three months' additional progress is achievable in schools or nearer four months when the approach is supported with professional development. However, some areas of the curriculum may benefit more from feedback than others. A recent meta-analysis of the impact of formative assessment on writing indicates gains of 8 months' progress are achievable, which is more consistent with other feedback research.

What are the costs?

The costs of providing more effective feedback are not high. However, it is likely to require sustained professional development to improve practice, and this includes active inquiry and evaluation. Overall, costs are estimated as under £80 per pupil and very low.

Feedback: What should I consider?

Before you implement this strategy in your learning environment, consider the following:

1. Providing effective feedback is challenging. These findings from the broader research may help you to implement it well. Effective feedback tends to be: specific, accurate and clear (e.g. "It was good because you..." rather than just "correct"); compare what a learner is doing right now with what they have done wrong before (e.g. "I can see you were focused on improving X as it is much better than last time's Y..."); encourage and support further effort; be given sparingly so that it is meaningful; provide specific guidance on how to improve and not just tell students when they are wrong; be supported with effective professional development for teachers.
2. Broader research suggests that feedback should be about complex or challenging tasks or goals as this is likely to emphasise the importance of effort and perseverance as well as be more valued by the pupils.
3. Feedback can come from peers as well as adults (see [Peer tutoring](#)).
4. Have you considered the challenges of implementing feedback effectively and consistently in your school?
5. What professional development is likely to be necessary for successful implementation of feedback in your school?

Technical Appendix

Definition

Feedback is information given to the learner and/or teacher about the learner's performance relative to learning goals or outcomes. It should aim to (and be capable of) producing improvement in students' learning. Feedback redirects or refocuses either the teacher's or the learner's actions to achieve a goal, by aligning effort and activity with an outcome. It can be about the output of the activity, the process of the activity, the student's management of their learning or self-regulation, or them as individuals. This feedback can be verbal or written, or can be given through tests or via digital technology. It can come from a teacher or someone taking a teaching role, or from peers.

Search terms: feedback; formative evaluation; assessment for learning; feedback interventions. corrective feedback.

Evidence Rating

There are seven meta-analyses of feedback and feedback interventions which have consistently found high average effects of feedback on learning and academic performance. Only two of these have been conducted in the last 10 years. Many of the studies included are small scale studies from psychology which demonstrate theoretical principles, but which may be difficult to generalise to educational practice. Larger scale educational studies tend to have lower effects. The meta-analyses include a very wide range of effects. Overall the evidence is rated as moderate.

Additional Cost Information

The costs of providing more effective feedback are not high. However it is likely to require sustained professional development to improve practice, and this includes active inquiry and evaluation. Overall, costs are estimated as under £80 per pupil and very low.

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Summary of effects

Meta-analyses	Effect size	FSM effect size
Bangert-Drowns, R. L., Kulik, C. L. C., Kulik, J. A., & Morgan, M., (1991)	0.26	-
Fuchs, L.S. & Fuchs, D., (1986)	0.72	-
Graham, S., Hebert, M., & Harris, K. R., (2015)	0.61	- Writing
Kingston, N. & Nash, B., (2011)	0.20	- (AFL)
Kluger, A. N., & DeNisi, A., (1996)	0.41	-
Lysakowski, R.S., & Walberg, H.J., (1982)	0.97	-
Tenenbaum, G., & Goldring, E., (1989)	0.72	-
Weighted mean	0.63	

The right hand column provides detail on the specific outcome measures or, if in brackets, details of the intervention or control group.

Meta-analyses abstracts

1 *Bangert-Drowns, R. L., Kulik, C. L. C., Kulik, J. A., & Morgan, M. (1991)*

Feedback is an essential construct for many theories of learning and instruction and an understanding of the conditions for effective feedback should facilitate both theoretical development and instructional practice. In an early review of feedback effects in written instruction Kulhavy (1977) proposed that feedback's chief instructional significance is to correct errors. This error-correcting action was thought to be a function of presentation timing, response certainty and whether students could merely copy answers from feedback without having to generate their own. The present meta-analysis reviewed 58 effect sizes from 40 reports. Feedback effects were found to vary with for control for pre-search availability, type of feedback, use of pre-tests and type of instruction and could be quite large under optimal conditions. Mediated intentional feedback for retrieval and application of specific knowledge appears to stimulate the correction of erroneous responses in situations where its mindful (Solomon & Globerson, 1987) reception is encouraged.

7 *Fuchs, L.S. & Fuchs, D. (1986)*

While the aptitude treatment interaction (ATI) approach to educational measurement emphasizes establishing salient learner characteristics, systematic formative evaluation provides ongoing evaluation for instructional program modification. Systematic formative evaluation appears more tenable than ATI for developing individualized instructional programs. This meta-analysis investigates the effects of educational programs on student achievement. Twenty-one controlled studies generated 95 relevant effect sizes, with an average effect size of .72. The magnitude of effect size was associated with publication type, data evaluation methods, and use of behaviour modification. Findings indicate that unlike reported ATI approaches to individualization, systematic formative evaluation procedures reliably increase academic achievement. This suggests that, given an adequate measurement methodology, practitioners can inductively formulate successful individualized educational programs.

8 *Graham, S., Hebert, M., & Harris, K. R. (2015)*

To determine whether formative writing assessments that are directly tied to everyday classroom teaching and learning enhance students' writing performance, we conducted a meta-analysis of true and quasi-experiments conducted with students in grades 1 to 8. We found that feedback to students about writing from adults, peers, self, and computers statistically enhanced writing quality, yielding average weighted effect sizes of 0.87, 0.58, 0.62, and 0.38, respectively. We did not find, however, that teachers' monitoring of students' writing progress or implementation of the 6 _ 1 Trait Writing model meaningfully enhanced students' writing. The findings from this meta-analysis provide support for the use of formative writing assessments that provide feedback directly to students as part of everyday teaching and learning. We argue that such assessments should be used more frequently by teachers, and that they should play a stronger role in the Next-Generation Assessment Systems being developed by Smarter Balanced and PARCC.

10 *Kingston, N. & Nash, B. (2011)*

An effect size of about .70 (or .40–.70) is often claimed for the efficacy of formative assessment, but is not supported by the existing research base. More than 300 studies that appeared to address the efficacy of formative assessment in grades K- 12 were reviewed. Many of the studies had severely flawed research designs yielding un-interpretable results. Only 13 of the studies provided sufficient information to calculate relevant effect sizes. A total of 42 independent effect sizes were available. The median observed effect size was .25. Using a random effects model, a weighted mean effect size of .20 was calculated. Moderator analyses suggested that formative assessment might be more effective in English language arts (ELA) than in mathematics or science, with estimated effect sizes of .32, .17, and .09, respectively. Two types of implementation of formative assessment, one based on professional development and the other on the use of computer-based formative systems, appeared to be more effective than other approaches, yielding mean effect size of .30 and .28, respectively. Given the wide use and potential efficacy of good formative assessment practices, the paucity of the current research base is problematic. A call for more high-quality studies is issued.

11 Kluger, A. N., & DeNisi, A. (1996)

Since the beginning of the century, feedback interventions (FIs) produced negative—but largely ignored—effects on performance. A meta-analysis (607 effect sizes; 23,663 observations) suggests that FIs improved performance on average ($d = .41$) but that over 1/3 of the FIs decreased performance. This finding cannot be explained by sampling error, feedback sign, or existing theories. The authors proposed a preliminary FI theory (FIT) and tested it with moderator analyses. The central assumption of FIT is that FIs change the locus of attention among 3 general and hierarchically organized levels of control: task learning, task motivation, and meta-tasks (including self-related) processes. The results suggest that FI effectiveness decreases as attention moves up the hierarchy closer to the self and away from the task. These findings are further moderated by task characteristics that are still poorly understood.

13 Lysakowski, R.S., & Walberg, H.J. (1982)

To estimate the instructional effects of cues, participation, and corrective feedback on learning 94 effect sizes were calculated from statistical data in 54 studies containing a combined sample of 14,689 students in approximately 700 classes. The mean of the study-weighted effect size is .97, which suggest average percentiles on learning outcomes of 83 and 50 respectively, for experimental and control groups. The strong effects appeared constant from elementary level through college, and across socioeconomic levels, races, private and public schools, and community types. In addition the effects were not significantly different across the categories of methodological rigor such as experiments and quasi-experiments.

15 Tenenbaum, G., & Goldring, E. (1989)

Estimated the effect of enhanced instruction on motor skill acquisition in a metaanalysis of 15 studies that used 4–5 yr old children and 4th–21th graders in Israel. Ss exposed to enhanced instruction gained more qualified motor skills than over 75% of the Ss exposed to regular instruction in a variety of motor skills. Enhanced instruction used cues and explanations by the instructor to clarify the motor skill, encouraged Ss to actively participate in the task over 70% of the time, reinforced Ss' responses, and supplied ongoing feedback and correctives to ensure motor skill acquisition.